

Unit 9 Day 3

p137: 33-38, 43, 44, 54-56

$$(33) (\sqrt{m+7} + 3)^2 = (\sqrt{m-4})^2$$

$$m+7 + 6\sqrt{m+7} + 9 = m-4$$

$$6\sqrt{m+7} = -20$$

$$\sqrt{m+7} = -\frac{10}{3}$$

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$$(34) (\sqrt{r+5} - 2)^2 = (\sqrt{r-1})^2$$

$$r+5 - 4\sqrt{r+5} + 4 = r-1$$

$$-4\sqrt{r+5} = -10$$

$$(\sqrt{r+5}) = \left(\frac{5}{2}\right)^2$$

$$r+5 = \frac{25}{4}$$

$$r = -\frac{20}{4} + \frac{25}{4}$$

$$r = \frac{5}{4} \quad \left\{ \frac{5}{4} \right\}$$

$$(35) \sqrt{2z} = \sqrt{3z+12} - 2$$

$$2z = 3z+12 - 4\sqrt{3z+12} + 4$$

$$-z - 16 = -4\sqrt{3z+12}$$

$$\left(\frac{z}{4} + 4\right)^2 = (\sqrt{3z+12})^2$$

$$\frac{z^2}{16} + 2z + 16 = 3z + 12$$

$$\frac{z^2}{16} - z + 4 = 0$$

$$z^2 - 16z + 64 = 0$$

$$(z-8)^2 = 0$$

$$z-8=0$$

$$z=8 \quad \{8\}$$

$$(36) \sqrt{5k+1} - \sqrt{3k} = 1$$

$$(\sqrt{5k+1})^2 = (\sqrt{3k} + 1)^2$$

$$5k+1 = 3k + 2\sqrt{3k} + 1$$

$$2k = 2\sqrt{3k}$$

$$(k)^2 = (\sqrt{3k})^2$$

$$k^2 = 3k$$

$$k^2 - 3k = 0 \quad \{0, 3\}$$

$$k(k-3) = 0$$

$$k=0 \quad k=3$$

$$(37) (\sqrt{r+2})^2 = (1 - \sqrt{3r+7})^2$$

$$r+2 = 1 - 2\sqrt{3r+7} + 3r+7$$

$$-2r-6 = -2\sqrt{3r+7}$$

$$(r+3)^2 = (\sqrt{3r+7})^2$$

$$r^2 + 6r + 9 = 3r + 7$$

$$r^2 + 3r + 2 = 0$$

$$(r+2)(r+1) = 0$$

$$\begin{array}{l|l} r+2=0 & r+1=0 \\ r=-2 & r=-1 \end{array}$$

$$r+3 \geq 0$$

$$r \geq -3$$

$$\{-2\}$$

check $r=-2$

$$\sqrt{-2+2} \stackrel{?}{=} 1 - \sqrt{3(-2)+7}$$

$$0 = 1 - 1$$

$$0 = 0 \checkmark$$

check $r=-1$

$$\sqrt{-1+2} \stackrel{?}{=} 1 - \sqrt{3(-1)+7}$$

$$1 = 1 - 2$$

$$1 \neq -1$$

$$(38) (\sqrt{2p-5} - 2)^2 = (\sqrt{p-2})^2$$

$$2p-5 - 4\sqrt{2p-5} + 4 = p-2$$

$$-4\sqrt{2p-5} = -p-1$$

$$(\sqrt{2p-5})^2 = \left(\frac{p}{4} + \frac{1}{4}\right)^2$$

$$(2p-5) = \frac{p^2}{16} + \frac{p}{8} + \frac{1}{16}$$

$$32p-80 = p^2 + 2p + 1$$

$$p^2 - 30p + 81 = 0$$

$$(p-27)(p-3) = 0$$

$$p=27 \quad p=3$$

$$\{27\}$$

check $p=27$

$$\sqrt{2(27)-5} - 2 \stackrel{?}{=} \sqrt{27-2}$$

$$17-2=5$$

$$5=5 \checkmark$$

check $p=3$

$$\sqrt{2(3)-5} - 2 \stackrel{?}{=} \sqrt{3-2}$$

$$1-2=1$$

$$-1 \neq 1$$

Unit 9 Day 3

$$\begin{aligned} (43) \quad [(2r-1)^{2/3}]^3 &= [r^{1/3}]^3 \\ (2r-1)^2 &= r \\ 4r^2 - 4r + 1 &= r \\ 4r^2 - 5r + 1 &= 0 \\ (4r-1)(r-1) &= 0 \\ r = \frac{1}{4} \quad | \quad r = 1 \\ \left\{ \frac{1}{4}, 1 \right\} \end{aligned}$$

Continued

$$\begin{aligned} (44) \quad [(z-3)^{2/5}]^5 &= [(4z)^{1/5}]^5 \\ (z-3)^2 &= 4z \\ z^2 - 6z + 9 &= 4z \\ z^2 - 10z + 9 &= 0 \\ (z-9)(z-1) &= 0 \\ z = 9 \quad z = 1 \\ \{9, 1\} \end{aligned}$$

$$\begin{aligned} (54) \quad d &= K\sqrt{h} \text{ for } h \\ \left(\frac{d}{K}\right)^2 &= (\sqrt{h})^2 \\ \frac{d^2}{K^2} &= h, K \neq 0 \end{aligned}$$

$$\begin{aligned} (55) \quad x^{2/3} + y^{2/3} &= a^{2/3} \text{ for } y \\ (y^{2/3})^3 &= (a^{2/3} - x^{2/3})^3 \\ y^2 &= (a^{2/3} - x^{2/3})^3 \\ y &= (a^{2/3} - x^{2/3})^{3/2} \end{aligned}$$

Extra Problems

$$\begin{aligned} (1) \quad (\sqrt{x+4} - \sqrt{x+3}) &= (\sqrt{3x+10})^2 \\ x+4 - 2\sqrt{(x+4)(x+3)} + x+3 &= 3x+10 \\ (-2\sqrt{(x+4)(x+3)})^2 &= (x+3)^2 \\ 4(x+4)(x+3) &= x^2 + 6x + 9 \\ 4(x^2 + 7x + 12) &= x^2 + 6x + 9 \\ 4x^2 + 28x + 48 &= x^2 + 6x + 9 \\ 3x^2 + 22x + 39 &= 0 \\ (3x+13)(x+3) &= 0 \\ \cancel{x = -13/3} \quad | \quad x = -3 \end{aligned}$$

$$\begin{aligned} (2) \quad (\sqrt{3(2m+3)})^2 &= (\sqrt{5m-6})^2 \\ (3\sqrt{2m+3})^2 &= (5m-6)^2 \\ 9(2m+3) &= 25m^2 - 60m + 36 \\ 18m + 27 &= 25m^2 - 60m + 36 \\ 25m^2 - 78m + 9 &= 0 \\ (25m-3)(m-3) &= 0 \\ 25m-3=0 \quad | \quad m=3 \\ 25m=3 \quad | \quad \{3\} \\ m = \frac{3}{25} \end{aligned}$$

$$\begin{aligned} (3) \quad (3-\sqrt{x})^2 &= (\sqrt{25x-3})^2 \\ 9 - 6\sqrt{x} + x &= 25x - 3 \\ (x+12)^2 &= (8\sqrt{x})^2 \\ x^2 + 24x + 144 &= 64x \\ x^2 - 40x + 144 &= 0 \\ (x-36)(x-4) &= 0 \\ \cancel{x = 36} \quad | \quad x = 4 \end{aligned}$$

$$\begin{aligned} (4) \quad (2k-9)^{-2/3} + 4(2k-9)^{1/3} &= 0 \\ [(2k-9)^{-2/3}]^3 &= [4(2k-9)^{1/3}]^3 \\ (2k-9)^{-2} &= -64(2k-9) \\ \frac{1}{(2k-9)^2} &= -64(2k-9) \\ 1 &= -64(2k-9)^3 \\ \sqrt[3]{1} &= \sqrt[3]{-64(2k-9)^3} \\ 1 &= -4(2k-9) \\ 1 &= -8k + 36 \\ 8k &= 35 \\ k &= \frac{35}{8} \end{aligned}$$